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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,642	05/27/2005	David N. Roundhill	US020471US	4312

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BRIARCLIFF MANOR, NY 10510

EXAMINER

BEKELE, MEKONEN T

ART UNIT

PAPER NUMBER

2624

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/536,642

**Applicant(s)**

ROUNDHILL ET AL.

**Examiner**

MEKONEN BEKELE

**Art Unit**

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 July 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05/27/2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date \_\_\_\_\_

**DETAILED ACTION**

1. Claims 1-19 are pending in this application

**Priority**

2. Applicant's claim for domestic priority under 35 U.S.C 119(e) is Acknowledge based on the Provisional Application Serial No. 60/430,226, filed on December 2, 2002

**Drawings**

3. The Drawings filed on 05/27/2005 are accepted for examination

**Claim Rejections - 35 USC § 101**

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 1-11 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing (Reference the May 15, 2008 memorandum issued by Deputy Commissioner for Patent Examining Policy, John J. Love, titled "Clarification of 'Processes' under 35 U.S.C. 101" – publicly available at USPTO.GOV, "memorandum to examining corp"). The instant claims neither transform underlying subject matter nor positively

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tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. The method including the steps of:

"Surveying an image...", "analyzing a motion data...", and "scanning a limited region of the image" The applicant has provided no explicit and deliberate definition of "Surveying", "analyzing" and "scanning" to exclude steps completely performed mentally, verbally or without a machine. In order for a process to be "tied" to another statutory category, the structure of another statutory category should be positively recited in a step or steps significant to the basic inventive concept, and NOT just in association with statements of intended use or purpose, insignificant pre or post solution activity, or implicitly. The transform underlying subject matter to a different state or thing must satisfied three conditions: input (acquire) an image from a physical object, transformation the acquired image, and a depiction process of the transformed image. However, claims 1-11, are not addressing the depiction problem, i.e., is there a claimed depiction of the modified data or signal as an external (non- pure- data) representation of the physical object or substance, such as but not limited to a visual display. Further the claim limitations recited in the preamble have no weight. Therefore, the method claims 1-11 including the step of generating is of sufficient breadth that it would be reasonably interpreted as a series of steps completely performed mentally, verbally or without a machine.

### **Claim Rejections - 35 USC § 102**

The following is a quotation of the appropriate paragraphs of 35U.S.C.102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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5. *Claims 1-3,5,7-8 and 12-16 are rejected under 35 U.S.C. 102 (b) as being anticipated by Hatfield et al., (hereafter Hatfield), US Patent No. 5840032, published on November 24, 1998.*

As to claim 1, Hatfield teaches A method of capturing an image using an ultrasound system (**Abstract; Method and apparatus for three-dimensional ultrasound imaging**), comprising:

surveying the image to collect motion data (**Abstract, An ultrasound scanner collects B-mode or color flow mode images in a cine memory, i.e., for a multiplicity of slices, where the color flow mode is typically used to detect the velocity (motion) of fluid flow. Thus, the ultrasound scanner scans (survey) images to collect the velocity (motion) of fluid flow**);

analyzing the motion data to identify a flow in the image (**Abstract, Fig.1, element 4B, the color flow mode is typically used to detect the velocity (motion) of fluid flow. And the color flow (CF) processor 4B is used to provide a real-time two-dimensional image of blood velocity in the imaging plane by analyzing the output of the beamformer 2 data**).

scanning a limited region of the image containing the flow with a flow imaging technique(col.4 lines 25-27, method and an apparatus for three-dimensional imaging by projecting ultrasound data acquired by scanning a volume of interest(limited region of the image). **The ultrasound scanner collects B-mode or color flow mode images in a cine memory on a continuous basis**).

As to claim 2, Hatfield teaches surveying step comprises the step of collecting a sample of color flow data (**Abstract, An ultrasound scanner collects B-mode or color flow mode**

images in a cine memory, i.e., for a multiplicity of slices, where the color flow mode is typically used to detect the velocity (motion) of fluid flow).

As to claim 3, Hatfield teaches surveying step comprises the step of collecting contour data (Abstract, col. 1 lines 15-20, An ultrasound scanner collects B-mode or color flow mode images, where the B- mode is used to image internal visual structure(contour), and color flow used to image flow characteristics, such as in blood vessels. Thus, ultrasound scanner scans (survey) the internal visual structure (contour) to collect contour data).

As to claim 5, Hatfield teaches the flow imaging technique includes a technique selected from the group consisting of: color flow (Abstract, Fig. 1element 4B), time domain correlation (Abstract, the color flow velocity which is expressed in time domain ), speckle tracking(col.6 lines 30-35, To prevent the selection of maximum intensities which are bright speckle as opposed to desired pixel data, a filter can be used to remove such bright speckle intensities prior to projection), strain imaging, pulse wave Doppler, and continuous wave Doppler (Abstract, col. 1 lines 15-20, Doppler, and color flow used to image flow characteristics, such as in blood vessels).

As to claim 7, Hatfield teaches the flow indicates a blood vessel (co. 1 lines 5-10).

As to claim 8, Hatfield teaches the scanning step uses multi-line beamforming (Fig. 1. element 2 col. 3 lines 39-42, Beamformer2, the beamformer2 has multiple channels).

As to claim 12, Hatfield teaches an ultrasound system (**Abstract; Method and apparatus for three-dimensional ultrasound imaging**), comprising:

a survey system for collecting motion data from a target image (**Abstract, An ultrasound scanner collects B-mode or color flow mode images in a cine memory, i.e., for a multiplicity of slices, where the color flow mode is typically used to detect the velocity (motion) of fluid flow. Thus, the ultrasound scanner apparatus scans (survey) images to collect the velocity (motion) of fluid flow**);

a segmentation system (**col.4 lines 26-30, apparatus for three-dimensional imaging by projecting ultrasound data acquired by scanning a volume of interest. The object volume is scanned using a multiplicity of parallel slices having a substantially uniform thickness**) for mapping a region of flow within the image based on the motion data (**Abstract, ultrasound scanner collects B-mode or color flow images in a cine memory, i.e., for a multiplicity of slices. Thus, the color flows image data mapped on multiplicity of parallel slices regions of the image**);

a flow acquisition system (**Fig. 4b, color flow processor**) that automatically limits the collection of flow image data within the image to the region of flow(**Abstract, Fig.1, col.1 lines 65-67, the color flow (CF) processor 4B is used to provide a real-time two-dimensional image of blood velocity in the imaging plane**).

Regarding claims 13-16, all claimed limitation are set forth and rejected as per discussion for claims 2, 3, 5 and 8 respectively.

**Claim Rejections - 35 USC § 103**

The following is a quotation of the 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the difference between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4,6,9,10,11,17,18 and 19 are rejected under 35 U.S.C 103 as being unpatentable over Sumanaweera, US Patent No. 6475149 B1, published on Nov. 2, 2002, in view of Hatfield et al., (hereafter Hatfield), US Patent No. 5840032, published on November 24, 1998.

Regarding claim 4, Hatfield does not specifically teach "step generates a motion map that identifies flow and non-flow regions;" **although Hatfield suggests method and an apparatus for three-dimensional imaging by projecting (mapping) ultrasound data acquired by scanning a volume of interest. The ultrasound scanner collects B-mode or color flow mode (col. 4 lines 25-30).**

On the other hand vessel border detection method and system of Sumanaweera teaches the flow is associated with a valve in a heart

It would have been obvious to one of ordinary skill in the art the time of invention was made to incorporate the method and system of vessel boarder detection of Sumanaweera into the method and apparatus for three-dimensional ultrasound imaging using transducer array having uniform elevation beamwidth of Hatfield, because both Hatfield and Sumanaweera are directed to tissues and blood flow analysis based on ultrasound image (**Sumanaweera: Abstract, Hatfield: Abstract**).



It would have been obvious to one of ordinary skill in the art the time of invention was made to incorporate the vessel border detection technique of Sumanaweera into Hatfield, because that would have allowed user of Hatfield to detect a well defined border of an entire fluid region of a vessel(Sumanaweera: col.2 lines 35-40).

Regarding claim 6, Hatfield does not specifically teach "the flow is associated with a valve in a heart" **although Hatfield suggests frequency of sound waves reflecting from the inside of blood vessels, heart cavities in the background.**

On the other hand vessel border detection method and system of Sumanaweera teaches the flow is associated with a valve in a heart **(col. 1 lines 55-54, Borders for other fluid regions in a patient may be detected, such as a heart border or other organ borders)**

As to claim 9, Sumanaweera teaches the flow is periodically tracked **(co1.3 lines 7-10, the analog or digital circuits of beamformer generates a periodic waveforms based on the sampling rate of the converter. Thus the transmitted wave form signal is a periodic signal with predetermined period)** and the limited region of the image containing the flow is automatically adjusted **(Fig. 3, col. 5 lines 29-30, the borders 48, 50 of the vessel 44 are detected automatically by the processor 22. The region of the image containing the flow corresponds to the Vessel borders 48, 50).**

As to claim 10, Hatfield teaches the limited region for acquisition is a region selected from the group consisting of a 3D pie slice (col.4 lines 25-28, a method for three-dimensional imaging by projecting ultrasound data acquired by scanning a volume of interest. The object volume is scanned using a multiplicity of parallel slices having a substantially uniform thickness),

However Hatfield does not teach "a cube, an arbitrary shape and a collection of shapes"

On the other hand Sumanaweera teaches a cube, an arbitrary shape and a (col. 5 line 62-63, heart, brachial artery) collection of shapes (col. 5 lines 65-66, heart or heart or other fluid filled or fluid surrounded organs);

As to claim 11, Sumanaweera teaches the scanning step includes adjusting a set of acquisition parameters (col. 5 lines 30-35, the method includes different embodiment for example in one embodiment a center of gravity of Doppler data is identified as an approximate center of the vessel or organ. Adjusting a set of acquisition parameters correspond to approximate center of the vessel or organ) selected from the group consisting of b-mode line densities (col. 3 lines 17-18, B- mode may be compressed or filtered), color flow line densities (col. 4 line 51-52, the color Doppler), pulse repetition frequency (col. 3 lines 6- 10, the beamformer for generating a transmit wave, and output a radio frequency data. Adjusting a set of acquisition parameters corresponds to transform the signal into a radio frequency), and the pulse repetition frequency corresponds to the radio frequency), and ensemble length.

Regarding claims 17-19, all claimed limitation are set forth and rejected as per discussion for claims 9-11 respectively.

**Contact information**

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Mekonen Bekele whose telephone number is 571-270-3915. The examiner can normally be reached on Monday -Friday from 8:00AM to 5:50 PM Eastern Time. If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor AHMED SAMIR can be reached on (571)272-7413. The fax phone number for the organization where the application or proceeding is assigned is 571-237-8300. Information regarding the status of an application may be obtained from the patent Application Information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished application is available through Privet PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have question on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866.217-919 (tool-free)

/MEKONEN BEKELE/  
Examiner, Art Unit 2624  
October 20, 2009

/Brian Q Le/

**Primary Examiner, Art Unit 2624**